IN THE CLAIMS

We claim:

1. An apparatus comprising:

a holder adapted to mount a substrate;

a stage adapted to position said holder in a chamber;

a pumping system adapted to evacuate said chamber;

an imaging system adapted to locate an opaque defect in said substrate;

a gas delivery system adapted to dispense a reactant gas towards said defect; and

an electron delivery system adapted to direct electrons towards said opaque defect.

2. The apparatus of claim 1 wherein said imaging system comprises an electron column.

3. The apparatus of claim 1 wherein said electron delivery system comprises an electron column.

4. The apparatus of claim 1 wherein said substrate comprises a transmissive DUV mask.

5. The apparatus of claim 1 wherein said opaque defect comprises chrome and said reactant gas comprises chlorine and oxygen.

6. The apparatus of claim 1 wherein said substrate comprises a reflective EUV mask.

7. The apparatus of claim 1 wherein said opaque defect comprises an absorber and said reactant gas comprises Xenon Fluoride ($XeF_2$).

8. The apparatus of claim 1 wherein said opaque defect comprises Carbon and said reactant gas comprises water vapor or oxygen.

9. The apparatus of claim 1 further comprising a focusing system adapted to highly focus said electrons on said opaque defect.

10. The apparatus of claim 1 further comprising a scanning system adapted to scan said electrons across said opaque defect.

11. The apparatus of claim 1 further comprising an acceleration system adapted to provide a low acceleration voltage for said electrons.

12. The apparatus of claim 1 further comprising a computer adapted to control said electron delivery system.

13. A method comprising:

providing a substrate;

forming a layer over said substrate;

patterning said layer into a first region and a second region;

removing said layer in said first region;

inspecting said first region for an opaque defect;

forming a reactant gas over said opaque defect; and

directing electrons toward said opaque defect, said electrons inducing said reactant gas to etch said opaque defect.

14. The method of claim 13 wherein said reactant gas etches said opaque defect without damage to said substrate.

15. The method of claim 13 wherein said opaque defect comprises chrome and said reactant gas comprises chlorine and oxygen.

16. A method comprising:

providing a substrate;

forming a mirror over said substrate;

forming a buffer layer over said mirror;

forming an absorber layer over said buffer layer;

patterning said absorber layer into a first region and a second region;

removing said absorber layer in said first region;

inspecting said first region for an opaque defect;

dispensing a reactant gas over said opaque defect;

scanning an electron beam over said opaque defect, said electron beam inducing said reactant gas to react with said opaque defect to form a volatile byproduct; and

removing said buffer layer in said first region.

17. The method of claim 16 wherein said opaque defect comprises an absorber and said reactant gas comprises Xenon Fluoride ($XeF_2$).